

## SECTION VII.—WEATHER AND DATA FOR THE MONTH.

## THE WEATHER OF THE MONTH, MARCH, 1916.

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## PRESSURE.

The distribution of the mean atmospheric pressure over the United States and Canada and the prevailing direction of the winds are graphically shown on Chart VII, while the average values for the month at the several stations, with the departures from the normal, are shown in Tables I and III.

For the month as a whole, the mean barometric pressure was above the normal in all districts from the Rocky Mountains westward and also locally in the Upper Lake region and along the immediate Gulf Coast. The plus departures, however, were generally small, except that they were rather pronounced from the Central Plateau districts westward to the Pacific. To the eastward of the Rockies, the monthly averages were below the normal, except in the local areas previously mentioned, with rather pronounced negative departures, especially in the central and north Atlantic Coast districts.

At the beginning of the month, a low-pressure area moved rapidly eastward from the southern Plains region, and was followed by a high of considerable magnitude, but from the 5th to the 9th another marked low moved across the central portions of the country from the Pacific to the Atlantic. This depression reached the New England coast as a storm of great intensity, the barometer at Eastport, Me., reading 28.92 inches on the 9th at 8 a. m. During the following 4 or 5 days, pressure was relatively high quite generally throughout the country, but about the middle of the month considerably lower readings obtained in eastern districts, which, however, were soon displaced by a high area advancing from the west. During the first 2 or 3 days of the third decade, marked low pressure again obtained from the Rocky Mountains eastward, and unsettled barometric conditions, with a tendency to rather low readings in most districts, continued until the end of the month.

The distribution of the highs and lows was generally favorable for southerly winds in the South Atlantic and Gulf States and northerly over all other districts east of the Rockies, while variable winds obtained to the westward.

## TEMPERATURE.

Freezing temperature was recorded at some time during the month in all sections, except in the extreme southern portions and along the Pacific Coast. Temperatures were below zero in the northern States from Montana eastward and as far south as central Kansas, while in portions of the northern Plains States they were more than 20° below zero. Readings of 90° occurred in southeastern Kansas, over most of Texas and Oklahoma, and in the southern portions of Arizona and California, while they were 100° at Fort Worth, Tex., and Yuma, Ariz. The highest previous records for March were equaled or exceeded in western Louisiana, northern Texas, south-

western Arizona, the southern portion of California and Utah, and in Nevada, while the lowest were equaled or exceeded in the northeastern districts. At Wichita, Kans., there occurred a maximum as high as any previous record and also a minimum 1 degree lower than heretofore recorded in March for 28 years.

The monthly mean temperature was below the normal in most eastern and northeastern districts, while it was higher than the average in most central and western sections, the greatest plus departures occurring along the eastern Rocky Mountain slope.

Killing frosts occurred in northern Florida, and light frosts as far south as the central portion of that State on the 5th, 9th, and 16th, and frosts were general in the southeastern States on the 17th and 18th.

## PRECIPITATION.

During the first 2 or 3 days of the month rain or snow fell in nearly all portions of the country, but the falls were generally light, and during the following day or two fair weather was the rule. About the middle of the first decade, unsettled, showery weather set in over the Pacific Coast States and by the end of the decade it had reached the Atlantic Coast, but again the falls were mostly only moderate to light. The second decade brought generally fair weather which continued throughout that period, except for some showers about the middle of the month in the eastern States. Unsettled, showery weather was the rule in most districts during the third decade, except that fair weather predominated near the close of the month.

For the month as a whole, the precipitation was very irregularly distributed, being much in excess of the normal along the north Pacific coast and slightly above to the eastward along the northern border to New York, and likewise at points in the upper Mississippi and lower Missouri valleys and the central Rocky Mountain region. It was below the normal in northern New York, southern New England, and on the California coast, and was markedly deficient in practically all the Gulf States, while almost no precipitation occurred in Texas until the last day of the month, when moderate to heavy rains fell in the northern and central portions. In extreme southwestern Texas and at points along the eastern Rocky Mountain slope, no rain, or only very slight amounts, occurred.

The deficiency of rainfall along the immediate central Gulf Coast was between 4 and 5 inches, and rain was much needed in the Florida Peninsula at the end of the month. Heavy rainfall and melting snow caused general floods during the latter part of the month in Ohio, northern Illinois, lower Michigan, Wisconsin, and North Dakota, while a destructive storm crossed Indiana on the night of the 21st, causing some loss of life and property damage amounting to over \$1,000,000. This storm is again referred to at the end of the summary.

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## SNOWFALL.

The month opened with the ground generally covered with snow in the central and northern portions of the country, but it disappeared from the central districts during the first week. The snow line moved northward during the remainder of the month, so that at the close the only areas covered by snow were the extreme north-eastern States and the upper and western Lake region.

The snowfall was much greater than usual from New Jersey and central Pennsylvania northward, and it also was above the normal in most districts north of the Ohio River, from 2 to 3 feet occurring in the central portions of New England and New York. In the far western mountains some additions were made to the snowfall already stored, so that at the close of the month the outlook for water for irrigation and other purposes in nearly all the western districts was the best for several years.

## GENERAL SUMMARY.

The weather conditions were generally favorable for farm work in most southern sections, except that in Texas planting was delayed by dry weather. The development of vegetation was delayed by cold weather in the Middle Atlantic States, but in the central Rocky Mountain districts it was in advance of the season. The cold weather did considerable damage to truck in the southeastern States and much replanting was necessary, while some damage resulted to the peach and cherry blooms in that section as well as to early fruits in Arizona and southern New Mexico.

## LOCAL STORMS IN MARCH.

The following is a brief summary of a report of a storm that passed over the north-central portion of Indiana on March 21, 1916, submitted by the official in charge of the local office of the Weather Bureau at Indianapolis, Ind.

One of the most destructive wind storms that has visited this section for a number of years swept across the north-central portion of Indiana between 9:30 and 11:30 p. m., March 21, 1916. The greatest destructive force of the storm was felt in a comparatively narrow belt, extending from the southern part of Newton County eastward to the northern portion of Jay County, on the opposite side of the State. Owing to its occurrence at night, times given for the passage of the disturbance vary somewhat; but a close comparison of the different reports secured indicates that the damaging wind was experienced in the western part of the path between 9:30 and 10 p. m., and that it crossed Cass and Miami Counties between 11 and 11:30 p. m. This would require an eastward progress of from 60 to 70 miles an hour for the translation of the disturbance, but that rate does not, of course, represent the velocity of the wind which swept the path.

No thunderstorms were reported during the day in any part of Indiana or the adjoining States, but numerous such storms occurred during the following night over the northern portions of Illinois and Ohio, accompanied by heavy rain and hail, or rain and sleet.

Practically all reports describe the destruction as due to a high wind which lasted about 5 minutes, and swept a path of from 2 to 10 miles wide. While two persons reported the observation of a funnel cloud of the tornado character, a number stated that no such cloud was observed; but it is probable that the darkness made the

observation of clouds a matter of uncertainty. Practically all of the reports agree that the destructive wind blew from the northwest to southeast (in a few instances from west to east); and there is no mention made of any sudden shift in direction. In one or two places the debris appeared to be scattered in several directions, and one person reported observing broken timbers having a twisted appearance.

The greatest destruction appears to have been wrought in the counties of White, Cass, the northern parts of Grant and Blackford, and the southern part of Wells, but damage to a considerable extent occurred at practically all points in the path of the storm. Four persons were killed by the collapse of buildings, one was burned to death in the wreckage of his home, and many, probably a hundred, more or less severely injured. Numerous barns and buildings were demolished, several cars of a passenger train near Hanfield, Grant County, were blown from the track, and a great deal of live stock was killed. Telegraph, telephone, trolley, and electric-light wires in many parts of the region affected were blown down and the services seriously crippled. The property damage throughout the path of the storm, as conservatively estimated, will total between \$1,000,000 and \$1,500,000.

## Average accumulated departures for March, 1916.

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
New England.....	27.3	-5.6	-3.9	2.76	-1.10	-2.40	5.2	-0.5	73	-2
Middle Atlantic.....	35.6	-4.5	0.2	3.35	-0.30	-1.60	5.6	-0.1	65	-4
South Atlantic.....	32.6	-1.2	+6.8	1.86	-2.50	-5.70	3.9	-1.0	65	-10
Florida Peninsula.....	66.4	-3.9	+1.3	0.53	-1.70	-4.40	2.3	-1.6	71	-6
East Gulf.....	58.6	-0.6	+5.8	1.83	-3.30	-7.33	4.1	-0.9	67	-6
West Gulf.....	61.9	+4.0	+10.4	1.16	-2.00	-2.50	3.9	-1.2	61	-11
Ohio Valley and Tennessee.....	41.7	-2.4	+1.7	3.50	-0.90	+0.10	6.1	+0.1	70	-1
Lower Lakes.....	27.3	-5.6	-2.8	3.00	+0.40	+1.60	6.0	-0.6	78	+2
Upper Lakes.....	23.7	-3.9	-3.6	2.63	+0.40	+0.60	6.2	+0.2	80	+1
North Dakota.....	21.2	+0.3	-9.9	1.67	+0.70	+0.90	5.8	+0.2	84	+6
Upper Mississippi Valley.....	36.5	+0.5	+1.7	1.81	-0.80	+1.10	6.0	+0.3	75	+2
Missouri Valley.....	40.7	+4.6	+2.1	1.46	-0.50	-2.30	5.3	-0.4	71	-1
Northern slope.....	37.3	+6.5	-4.4	0.93	-0.20	+0.10	5.9	+0.5	62	-5
Middle slope.....	43.3	+5.8	+5.0	0.90	-0.60	-0.40	4.5	-0.1	52	-8
Southern slope.....	60.2	+7.1	+14.7	0.73	-0.10	-1.20	2.2	-1.6	37	-15
Southern Plateau.....	55.0	+4.0	+4.6	0.52	0.00	+1.50	2.9	-0.8	40	+4
Middle Plateau.....	45.2	+4.2	+3.5	1.13	-0.10	+1.40	3.9	-1.2	51	-5
Northern Plateau.....	45.8	+3.6	-3.5	1.97	+0.40	+1.50	7.3	+1.5	63	+3
North Pacific.....	45.4	+0.6	-4.4	9.45	+4.40	+5.60	7.3	+1.2	81	+6
Middle Pacific.....	53.6	+2.3	+2.1	1.82	-2.40	+2.70	4.2	-1.2	70	-4
South Pacific.....	59.1	+4.0	+1.8	1.45	-1.20	+6.20	3.6	-2.3	72	+1

## WEATHER CONDITIONS OVER THE NORTH ATLANTIC DURING MARCH, 1916.

The data presented are for March, 1915, and comparison and study of the same should be in connection with those appearing in the REVIEW for that month. Chart IX (XLIV-33) shows for March 1915 the averages of pressure, temperature, and prevailing direction of the wind at 7 a. m., 75th Meridian time, together with the locations and courses of the more severe storms of the month.

## PRESSURE.

The distribution of pressure for the month was abnormal in nearly all respects, and the average values were below the normal over the greater part of the ocean. The highest monthly average of the barometric readings